# ORAC Monthly Meeting
January 5, 2001

I. What is IHN?

Infectious hematopoetic necrosis disease.
Caused by a rhabdovirus, approximately 100 times smaller than a bacterium.
Also known in California as Sacramento River Chinook Disease, Chinook Salmon Virus Disease, and Coleman Disease.
Similar INHV strains occur in the Pacific Northwest which primarily affect sockeye salmon. (Sockeye Salmon Virus Disease).
These two diseases in different species are caused by different strains of the same virus.
The California strain primarily infects chinook salmon, but the virus has been found in kokanee, steelhead and rainbow trout.
Disease occurs in cold water environments, usually at temperatures below 15 C (60 F). Most severe disease outbreaks at or below 12 C (54 F).
The disease produced by the virus causes anemia and destruction of the kidney.
Losses can be severe, up to 95%.
The virus is endemic to California, with reports coinciding with the first operations of chinook salmon hatcheries.
First isolation of the virus was in 1958, due to the development of a test capable of isolating fish viruses. The virus existed much earlier than this.

II. History in California

It was first isolated at Coleman hatchery in 1960. Hatchery records indicated it was present since the opening of the hatchery in 1941.
Annual losses were experienced at Feather River and Nimbus hatcheries, up to 95%, but averaging 30 to 50%.
Also known from Mokelumne River, Merced River, and Trinity River Hatcheries.
IHNV was virtually eliminated from hatcheries since routine egg disinfection with iodophor was initiated in the late

1980's.
IHNV has been absent from all waters supplying fish hatcheries or private aquaculture facilities, until the recent discovery of virus in Lake Oroville (exceptions: Coleman National Fish Hatchery).

III. History at Feather River

Annual losses from 30 to 95% were experienced until the late 1980's when iodophor disinfection of eggs was adopted.
Last IHNV epizootic occurred 13 years ago, in 1987.
Two recent epizootics in 1998 and 2000 were associated with large numbers of chinook salmon planted into Lake Oroville
The recent IHNV strains differ genetically and serologically from the historical IHNV "Nimbus" strain.
In 1992 the first new strain was detected in returning adult chinook salmon. This strain was also isolated from hatchery production fish in the 1998 epizootic which resulted in 3.2 million mortalities.
In 2000 a second new strain caused an epizootic among hatchery fish, resulting in losses of 3.1 million fish, and required destruction of an additional ~700,000 inland chinook salmon.

III. History at Lake Oroville

Sampling began on November 2, 2000 and continued to December 19, 2000
A total of 13 chinook and 2 rainbow trout were collected in 7 electrofishing outings.
6 of 13 chinook were negative for virus....(3 of these 5 were not sexually ripe)
7 of 13 chinook were positive for virus.....(all sexually ripe)
2 of 2 rainbow trout were positive for virus.....(1 mature male, 1 immature female)
Serological work indicates it is probably the same virus strain (Feather River Type 2) which caused the epizootic in 2000 at Feather River Hatchery.

IV. Inland Chinook Program

Adult chinook salmon are checked for viruses including IHNV.
Only eggs from virus free adults are accepted into the inland program.
Fish are checked for virus when they are about 200/lb, or about 2 inches long.
If virus free, fish are then moved to the appropriate hatchery for further rearing.
Fish are monitored throughout the grow-out period for diseases, including viruses.
All samples must be free of virus for fish to be accepted into the inland program.

V. Proposed Management - recommendations to the directorate from senior staff

Suspend stocking of chinook salmon for 1 to 2 years.
Monitor the watershed for IHNV

- Hatchery
- Lake Oroville mature adults
- Returning adults

Alternative species for Lake Oroville sport fishery:

- Coho
- Lake trout

Possible lower stocking levels of chinook in the future.

VI. Current and future research

Testing of several species of salmonids for IHNV resistance

- Coho
- Lake trout
- Brown trout
- Rainbow trout - Pit River strain
- Coastal cutthroat
- Lahontan cutthroat
- Brook trout
- Kokanee

Expand monitoring efforts

- Feather River between Almanor and Oroville
- Lake Almanor
- Lower Feather River
- Others?